Diagnostic Assessment
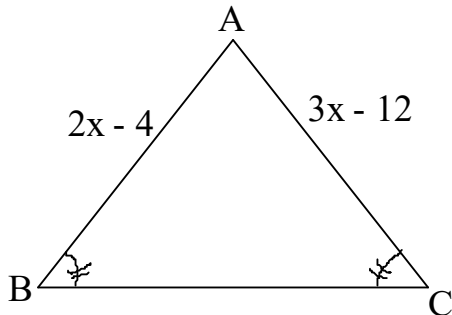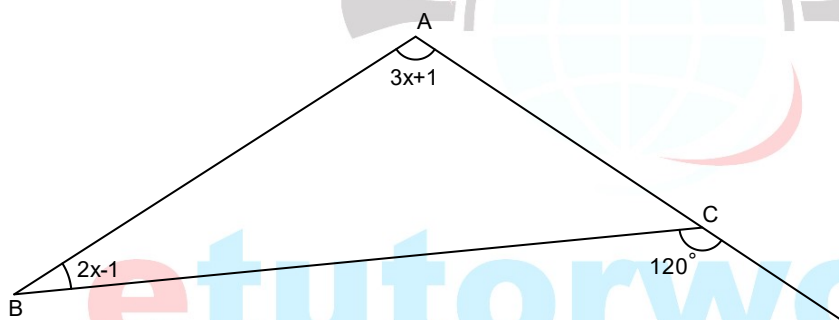## Geometry

1. In the triangle $\triangle ABC$, $\angle ABC = \angle ACB$ and $AB = 2x - 4$ and $AC = 3x - 12$, then x =

   (a)   4
   (b)   8
   (c)   12
   (d)   10

2. In the following diagram, $m\angle A$ is

   (a)   37°
   (b)   23°
   (c)   60°
   (d)   73°

3. If the reflection of the point P(a,b) about the origin lies in the IV quadrant, then the point P lies in
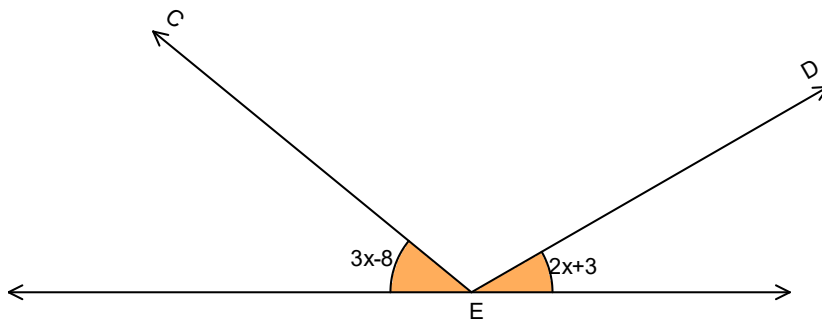   (a)   I quadrant
   (b)   II quadrant
   (c)   III quadrant
   (d)   IV quadrant

4. The reflected image of the point $(2,3)$ about the y-axis is
   (a) $(-2,3)$
   (b) $\left(\dfrac{1}{2},\dfrac{1}{3}\right)$
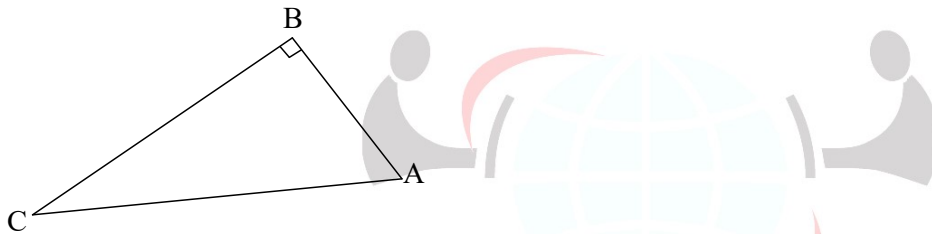   (c) $(2,-3)$
   (d) $(-2,-3)$

5. The measure of $\angle DEC$, if $x = 15$, is

- (a) 110°
- (b) 90°
- (c) 147°
- (d) 143°

6. In the right triangle ABC, if $AB = 5$ and $AC = 10$, then BC equals

- (a) $5\sqrt{5}$
- (b) $25\sqrt{5}$
- (c) $5\sqrt{3}$
- (d) 75

7. In an equilateral triangle ABC, if $AB = 10\,cm.$, then its area equals

- (a) $35\sqrt{5}$ cm.
- (b) $25\sqrt{3}$ cm.
- (c) $25\sqrt{5}$ cm.
- (d) 20 cm.

8. Half the perimeter of a square is 10 cm, then its area equals

- (a) $100\,cm^2$
- (b) $25\,cm^2$
- (c) $\dfrac{25}{4}\,cm^2$
- (d) $16\,cm^2$

9. Given a triangle ABC, which is right angled at B, the lengths are AB= 5 and AC= 13, Angle C = θ. Then $sin\theta =$ _____

(a). ⅓

(b) ⅗

(c) ⅚

(d) $\dfrac{5}{13}$

10. If the area of an equilateral ΔABC is 40 sq.cm, and its altitude is 16 cm, then its perimeter is
    (a)   15 cm.
    (b)   5 cm.
    (c)   25 cm.
    (d)   20 cm.

11. Find θ if cos θ = √3/2 and −π ≤ θ ≤ π.
    (a)   π/2
    (b)   π/3
    (c)   π/4
    (d)   π/6

12. If a cone and a cylinder have same height and volume, then the ratio of the radius of the cone to that of the cylinder is
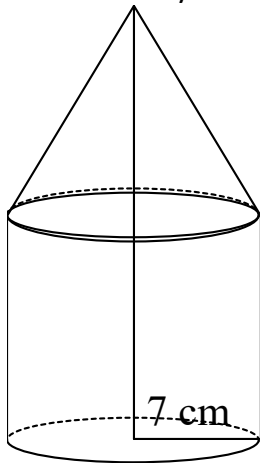   (a)   3 : 1
    (b)   1 : 3
    (c)   2 : 1
    (d)   1 : 2

13. The surface area of sphere of volume $4500\pi\, cm^3$ is
    (a) $900\pi\, cm^2$
    (b) $225\pi\, cm^2$
    (c) $1225\pi\, cm^2$
    (d) $1000\pi\, cm^2$

14. The volume of the figure given below where the radius is 7cm. and lateral surface area of the cylindrical part is 440 sq.cm. and the slant height is $\sqrt{74}$ is

(a) $\dfrac{2659\pi}{3} cm^3$

(b) $\dfrac{2695\pi}{3} cm^3$

(c) $\dfrac{2965\pi}{3} cm^3$

(d) $\dfrac{1715\pi}{3}$

7 cm

15. If a block of metal in the form of a cube of side 20 cm. is melted and cast into spheres of equal radius of 2 cm., then the number of such spheres is equal to (nearest to an integer)

(a) 230
(b) 225
(c) 237
(d) 238

Answer key & Explanations

1. (b): the triangle given is an isosceles triangle in which side AB and AC are equal. Then, solve the equation 2x-4 = 3x – 12 for x

2. (d): The 2 internal angles of a triangle add up to the external angle of the remaining 3rd angle of the triangle. So (3x+1)+(2x-1) = 120. After solving for x and substituting in (3x+1) = measure of angle A

3. (b):Hint: the reflection of the point (1, 4) about the origin is (-1, -4).

4. (a)

5. (a): angles on a straight line add up to be 180 degrees

6. (c): Use Pythagorean theorem. a² + b² = c²

7. (b): area of equilateral triangle=√3/4 x side²

8. (b): since half the perimeter is 10, hence the full perimeter would be 20. And each side of the square would be equal to 5

9. (d): Using the SOH-CAH-TOA rule, sin= opposite/hypotenuse

10. (a): Area of a triangle = 40 sq.cm = ½ X Base X Height = ½ X Base X 16.

11. (d)

12. (d): volume of cone = volume of cylinder

13. (a): volume of sphere= 4/3 ∏ radius² / surface area of sphere= 4 ∏ radius²

14. (d): Use the formulae: Lateral surface area of cylinder = 2πrh to get h = $\dfrac{220}{7\pi}$ cm

    Volume of Cylinder = πr²h = π(7)² × $\dfrac{220}{7\pi}$ = **1540 cm³**

    Height of cone = 5 cm (calculated using Pythagorean theorem)

    Volume of cone = $\dfrac{1}{3}$πr²h = $\dfrac{1}{3}$π(7)² × 5 = $\dfrac{245\pi}{3}$ **cm³**

    Total volume of given figure = 1540 + $\dfrac{245\pi}{3}$ = $\dfrac{1715\pi}{3}$ **cm³**

15. (d): volume of cube/volume of each sphere